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Survival rates of different postlarval stages of *Penaeus monodon* Fabricius

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Majority of *P. monodon* or sugpo fry produced by the hatcheries of the Aquaculture Department at Tigbauan, Iloilo, Philippines are stocked in ponds at the Leganes Station. Knowledge of which postlarval stages of sugpo yield maximum survival rates upon stocking in the ponds is essential for harvest purposes. The earliest postlarvae which exhibit high survival rates in ponds as well as sturdiness in travel would be ideal for harvesting. Hardiness in transport depends not so much on age of fry as on density, aeration, duration of travel, and lowering of temperature in the container to minimize cannibalism. Of secondary consideration is the fact that the longer the rearing period in the hatchery, the higher the cost per fry. With the development of inexpensive feeds in the future, this should become of minor importance.

The objective of this study is to determine survival rates of different postlarval stages upon stocking in the Leganes ponds. Commercial fry caught in the wild and sold to pond operators are usually of P_{20} stage. Villaluz, et al. (1972) recommended the harvest of P_{25} fry measuring 25 mm total length for stocking in ponds. Fry of the kuruma shrimp *P. japonicus* are harvested at P_{20-30} when they start to burrow in the bottom sand of hatchery tanks in contrast to their earlier pelagic life thereby injuring the telson or walking legs by hitting against the concrete wall (Fujinaga and Nakayama, 1974). It was also observed that survival is affected by size of *P. japonicus* fry upon stocking in nursery ponds (80-100% at 1.1 to 6.0 g; 65-70% at 0.02 g.)

Twelve 3m x 2m x 2m suspension nets made of nylon cloth (mesh size = 0.1 mm) were set up in a Leganes Station pond (ave. water depth = 1m) by means of 3-m long poles stacked at distances approximating the area of each net. The net bottom was filled with topsoil at least 15 cm thick to simulate the pond bottom. At least 60 cm of the upper edge of each net was above the water level to prevent mixing of water inside and outside the net. *P. monodon* of stages P_{11}, P_{15}, P_{21} (from the hatchery) and P_{25} (from the wet lab) were stocked in the nets at 200/sq m or 1,200 fry/net. Due to lack of fry, only one P_{25} net was stocked. Each net had two large dried *miapi* branches as shelter from predation and cannibalism for the young sugpo fry. Fresh *lablab* was fed at the rate of one pail (approximately 5 kg) every four days per net.

Analyses of water temperature, pH (colorimeter, standard solutions), oxygen (Winkler method), total alkalinity (methyl orange), and salinity ($AgNO_3$ titration) were taken regularly. Juveniles were harvested after 40 to 52 days.

Harvest data show relatively higher survival rates for P_{15} and P_{18} compared to P_{11} and P_{25} with no significant difference between these two stages (Table 1, Fig. 1). The results for P_{25} may not be valid because the stock came from the wet lab in comparison to the other postlarval stages which were reared in the hatchery. Moreover, the P_{25} stock had no replicates and the net itself (no. 10) was discovered to have many holes.

Fig. 2 shows the measurements of temperature, dissolved oxygen, pH, alkalinity and salinity in the pond during the experimental period; the ranges are found in Table 2. Water temperature was fairly constant; pH was close to neutral, not exceeding 9. Dissolved oxygen remained sufficient at levels of 6 ppm and higher, reaching a maximum of 14.3 ppm. Salinity approximated that of seawater except in the middle of August when rains diluted it to 23 ppt.

These preliminary results point to P_{15} as the best stage for harvest from the hatchery in terms of high pond recovery and lesser expense in rearing compared to older postlarvae. Duplicate runs are being planned with more effective control of feeding rate, predators and competitors, volume of water, etc. by means of thorough pond drying, attachment of a bamboo framework to the nets, and other improvements.

Fig. 1. Survival rates of different *P. monodon* postlarval stages in suspension nets.

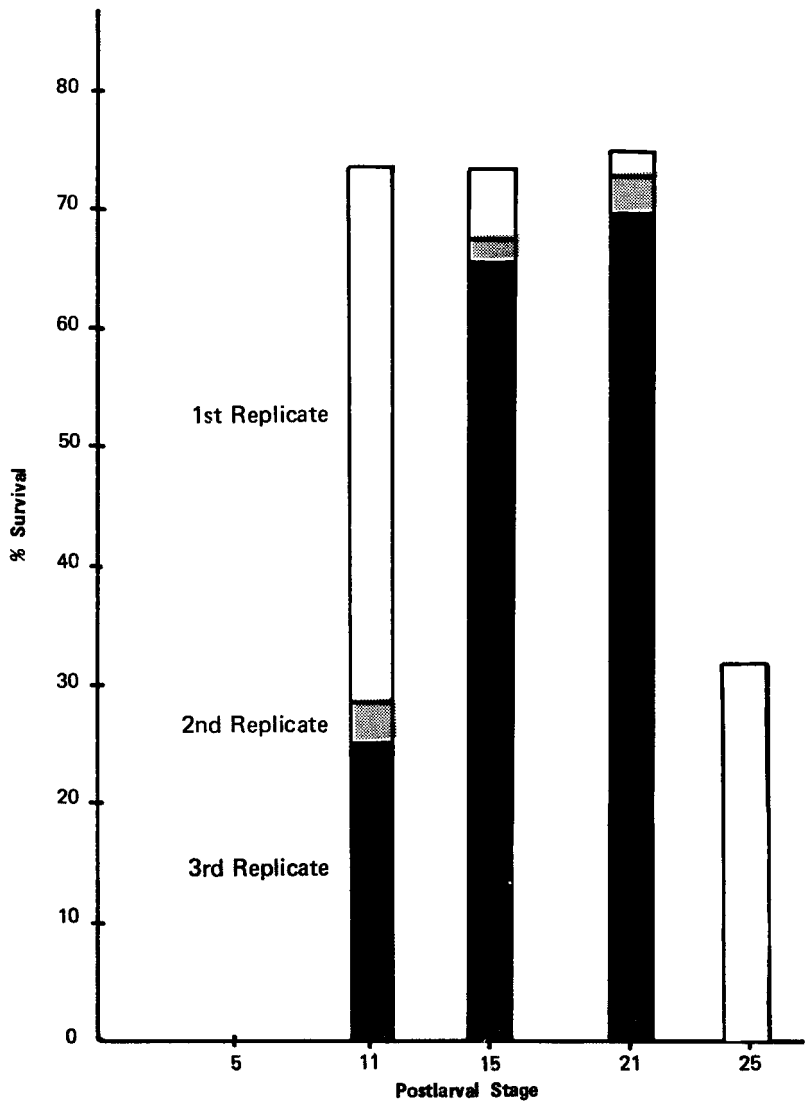

Fig. 2. Physicochemical measurements in the Experimental Pond, Leganes Station

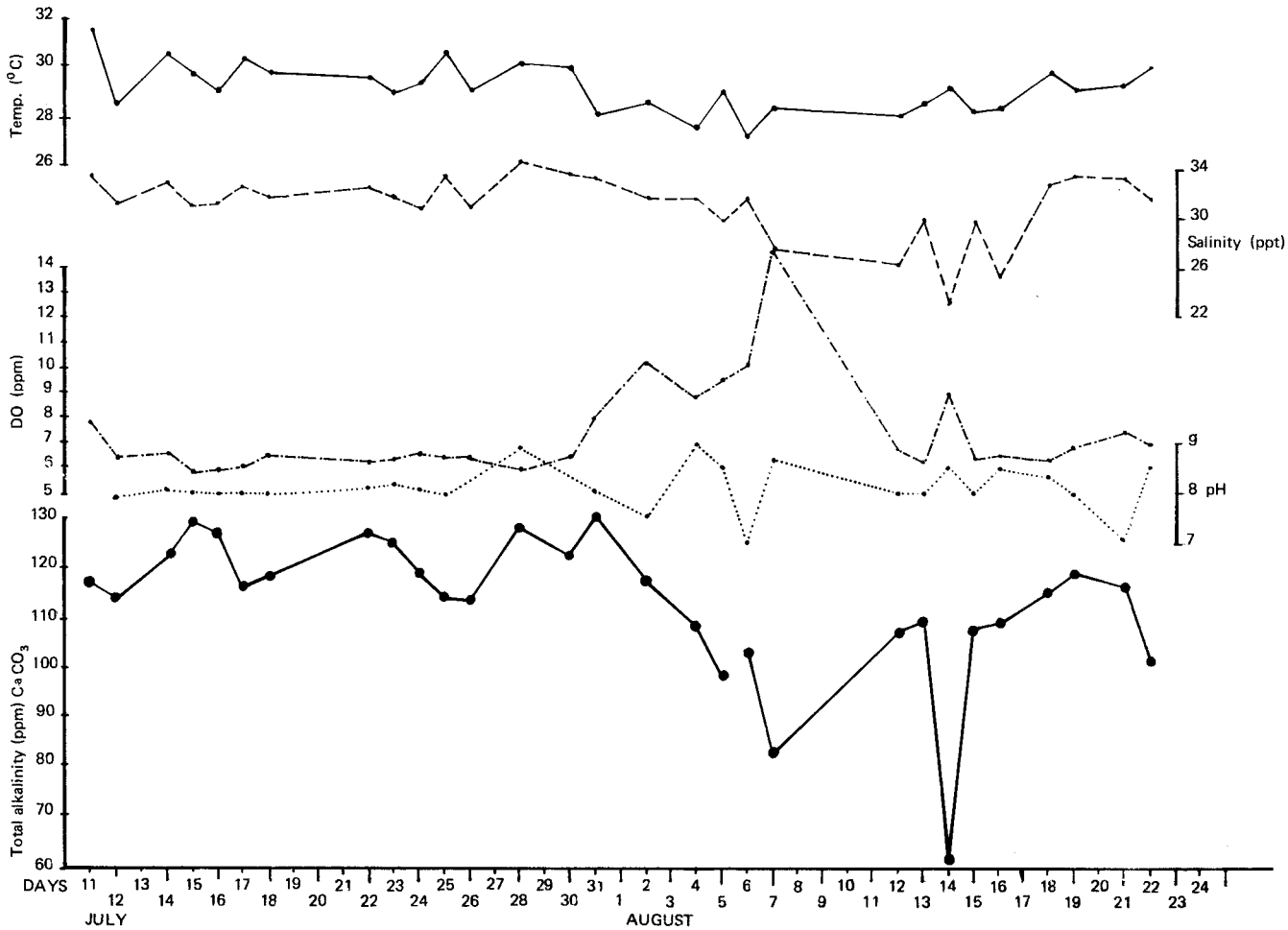

Table 1. Data on suspension net stocks of different postlarval stages of *P. monodon*.

Suspension Net. No.	Postlarval Stage	No. of Days	Initial Count	Final Count	% Survival	Remarks
1	P_{11}	40	1200	451	37.58	Harvest not thorough
2	P_{11}	40	1200	870	72.50	3 snakes
3	P_{11}	47	1200	501	41.75	
4	P_{15}	46	1200	595	65.33	Fry soft shelled; many goby fry; 1 large *Mugil* (?)
5	P_{15}	46	1200	871	72.58	
6	P_{15}	45	1200	801	66.75	
7	P_{21}	52	1200	870	72.50	
8	P_{21}	52	1200	890	74.71	
9	P_{21}	47	1200	836	69.67	
10	P_{25}	47	1200	831	31.75	Many holes in net fry from wet lab

Table 2. Ranges of physicochemical measurements in experimental pond, 11 August – 22 September, 1975.

Water temperature °C	pH	Dissolved oxygen, ppm	Salinity, ppt	Total alkalinity, ppm $CaCO_3$
27 – 31.5	7.0 – 8.9	5.9 – 14.3	23 – 33.5	82.5 – 129

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